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An examination of sex differences in delinquency

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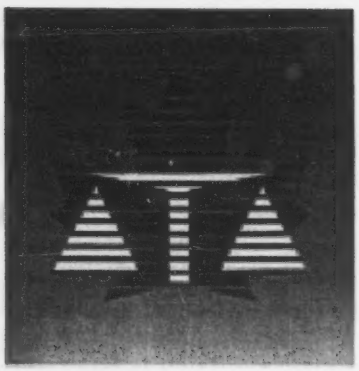

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Robin Fitzgerald, *Statistics Canada*

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Introduction

Studies show that there are persistent differences in the patterns, duration and intensity of offending among young males and females. A number of researchers have suggested that sex differences in delinquent behaviour may be due to differences in the way that males and females are affected by the same risk and protective factors (Mears et al. 1998; Sprott and Doob 2000; Burton et al. 1998). Understanding the sex differences in delinquent and offending behaviour is important with respect to the assessment of needs for these youth (Artz et al. 2001) and the development of policies and programs designed to target these behaviours.

The current study examines factors associated with delinquent behaviour in a Canadian sample of 12-15 year olds. The study investigates whether there are sex differences either in factors that may generate or promote delinquency or in factors that may inhibit or deter delinquency. Specifically, the study tests the sex differences in two factors identified in research as having a strong association with delinquency: the youth's level of commitment to school, and his or her experience of victimization.

The relationship between school commitment and delinquency

A lack of commitment to school or academic failure is often associated with the onset of delinquency and the escalation of serious offending. Strategies designed to increase a child's commitment to school have been shown to reduce the chances for delinquency (Maguin and Loeber 1996; Cairns and Cairns 1994; Loeber, Stuothamer-Loeber, Van Kammen and Farrington 1991).

Sprott, Jenkins and Doob (2000) found that the school environment acts as a protective factor for children who may be at highest risk for delinquency. For example, levels of delinquency were reduced for those who had the highest attachment to school, despite being exposed to a number of potential risk factors (e.g., single parent families, hostile parenting, maternal depression, neighbourhood problems, early childhood aggression, and association with delinquent peers).

Research has also consistently indicated that low school commitment is associated with the risk of the most serious forms of delinquency including gang involvement (Bjerregard and Smith 1993; Esbensen and Deschenes 1998; Hill et al. 1999).

These researchers have also pointed to sex differences in the link between school-related factors and youth involvement in gangs. For example, Esbensen and Deschenes (1998) studied the relationship between education and gang involvement for males and females. They report that educational attainment is associated with lower levels of gang involvement for females but not males. Moreover, they also found that the level of commitment to school is significantly lower among females in gangs than those who are not in gangs, but these same differences are not present

for males, who report similar levels of commitment to school regardless of their involvement in gangs.

The relationship between victimization and delinquency

Researchers have established a clear link between victimization and subsequent delinquent behaviour. This relationship exists regardless of the type of victimization. For example, victimization perpetrated by peers is often intertwined with delinquency. Studies based primarily on male youth indicate that as the seriousness of offending increases, so does the probability of having been violently victimized (Loeber, Kalb and Huizinga 2001).

Victimization experienced in the home or other environments and perpetrated by someone in a relationship of power over the victim, has also been linked to subsequent violent and non-violent offending. Evidence suggests that children who have been victims of various forms of maltreatment perpetrated by parents or caregivers are more likely than others to commit violent crimes later in life (Widom 1989; Zingraff et al. 1993; Smith and Thornberry 1995; Ireland et al. 1994).

Thus, regardless of the relationship to the perpetrator, youth who experience victimization have been demonstrated to be at greater risk of delinquency. The current study will examine whether victimization affects males and females in different ways.

The present study

The purpose of this study is to examine patterns of self-reported delinquent behaviour and associated risk and protective factors in a national household sample of males and females aged 12-15 years. Specific questions addressed are (1) Do males and females differ in the frequency or severity of self-reported delinquency? (2) Are there factors that may explain differences in male and female delinquency patterns? Or more specifically, do levels of commitment to school or experiences of victimization explain any sex differences that may be found?

This study assesses these questions separately for violent and property-related delinquency, since previous research suggests both that there may be different risk factors related to different types of delinquency (Sprott, Jenkins and Doob 2000; Moffit 1993), and that males and females differ in their propensity to commit these different types of delinquency (Mears et al. 1998; Espiritu et al. 2001).

Data source

The primary data source for this study is the National Longitudinal Survey of Children and Youth (NLSCY), developed jointly by Human Resources Development Canada and Statistics Canada. The NLSCY is a comprehensive survey that follows the development of children in Canada over time. The survey monitors child development and measures the prevalence of various factors that influence development, both positively and negatively.

The first cycle of the NLSCY, conducted in 1994-1995, interviewed parents of approximately 23,000 children up to and including age 11. They reported information not only about their children, but also about themselves and the children's immediate families, schools and neighbourhoods. In the second and third

cycles, the parents of these same children were interviewed. The NLSCY will continue to collect information on these same children every two years as they move into youth and adulthood.[1]

This study is based on cross-sectional files from the third cycle of the survey conducted in 1998-99. The cycle 3 sample contains 31,963 children aged newborn to fifteen years living in one of the ten provinces in 1998-99.

This study focuses on the subgroup of 4,296 youth aged 12-15 years in the cycle 3 cross-sectional file. These youth comprise the oldest age cohort in cycle 3, and are the only respondents to complete the self-report delinquency questions of interest in this study. The cross-sectional data are weighted to represent about 1,661,000 youth from 10 provinces aged 12-15 years.

Analytical techniques

Logistic regression[2] is employed to examine the odds of committing at least one violent or property-related delinquent act in the past year after controlling for the other variables in this study (see Text Box 3: What is an odds ratio?).

The results of the analyses presented in this paper assess the extent to which different factors *modify* the risk of delinquency among males and females while controlling for a number of additional socio-demographic factors. Using logistic regression models, the study tests for the interaction between sex on the one hand, and levels of school commitment and self-reported victimization on the other hand. Interaction is used to describe a situation in which two factors modify the effect of each other with respect to the occurrence of a given outcome.

For example, if an interaction between sex and school commitment is present with respect to delinquency then the association between school commitment and delinquency will be different for males and females. In order to visualize the presence of significant interactions, this paper presents a number of plots showing differences in the male and female likelihood for committing a delinquent act at different levels of the risk and protective factors. Each line on the graph represents the estimated logit, or log odds, for sex by either school commitment or victimization.

Some imputation was undertaken in order to address the problem of partial missing data, or cases where respondents answered some, but not all of the questions related to the concepts of interest in this study. This was the case only when the variable being measured was a scale, or a group of questions that characterize a single concept when added together. For example, the school commitment scale is composed of seven questions. Respondents receive a score based on the sum of their responses for these questions. To avoid losing partial respondents from the analysis, scores were calculated based on the mean for the answers that were provided, but only if at least 50% of the questions in a scale were answered. Examination of partial non-respondents for each scale in the study revealed that this type of response pattern is not related to the scale. For example, based on the answers that were provided, partial non-responders were not more or less likely to be delinquent. Consequently, imputing scores for those who answered at least 50% of the items in a scale provides a reasonable estimate of the score that would have been obtained if all items were answered. This imputation method served to decrease the non-response rate, without altering the results for models fitted in this study. This method of imputation was applied to the delinquency variables, as well as to the school commitment and victimization variables.

Cross-sectional weights are applied in all analyses in this paper in order to account for unequal probabilities of sample selection. The complex sample design of the NLSCY necessitates the use of the bootstrap technique to estimate coefficients of variation, confidence intervals and to test for statistical significance of differences (Rao et al. 1992; Rust and Rao 1996).

Variables in the analysis

Property-related and violent delinquency

In cycle 3, youth aged 12-15 were asked a series of questions about their involvement in violent and property-related delinquency. These concepts are analysed separately in this paper. The four-category response scales for each delinquency item ranged from never, to five times or more in the past year. Due to the relatively serious nature of the six violent and six non-violent or property-related delinquency items used in this analysis, each dependent variable is broken into two categories derived from the sum of the six questions, such that 0 = never committing a delinquent act and 1 = committing at least one of the delinquent acts, one or more times in the past year.

There are six items included in the *property-related delinquency* variable.[3] A cross-sectional weighted estimate of about 24% of 12-15 year olds indicated that they had committed one or more property-related delinquency acts in the previous year. The following items are included:

During the past 12 months, about how many times have you:

- Stolen something from a school or store?
- Broken into, or snuck into, a house or building with the idea of stealing something?
- Used or bought or tried to sell something you knew was stolen?
- Damaged or destroyed anything that didn't belong to you (for example, damaged a bicycle, car, school furniture, broken windows or written graffiti)?
- Taken a car, motorbike or motorboat without permission?
- Set fire on purpose to a building, a car, or something else not belonging to you?

The six items comprising the *violent delinquency* variable include acts of physical violence as well as acts that are associated with potential physical violence (e.g., carrying weapons).[4] About 20% (weighted) of 12-15 year olds indicated that they had committed one or more violent acts in the past year. The following items are included:

During the past 12 months, about how many times have you:

- Fought with someone to the point where they needed care for their injuries (for example, because they were bleeding, or had broken bones)?
- Been in a fight where you hit someone with something other than your hands (for example, a stick, club, knife, or rock)?
- Carried a knife for the purpose of defending yourself or using in a fight?
- Carried a gun other than for hunting or target shooting?
- Carried any other weapon such as a stick or a club?
- Threatened someone in order to get his or her money or things?

School commitment

School commitment provides a measure of a youth's orientation toward the school environment. The *school commitment* score is based on seven items describing attitudes such as the level of importance placed on doing well in school, making new friends at school, participating in school activities, showing up for class on time, learning new things, expressing one's own opinion at school and participating in student council. Response categories ranged from 0 to 3, where 0 corresponds to 'very important' and 3 corresponds to 'not important at all'. The score resulting from the combined items ranges from 0 (a high level of school commitment) to 21 (a low level of school commitment).[5]

Self-reported victimization

The derived victimization variable used in this study includes both threats and actual physical harm, since previous research has indicated that the threat of physical violence can have serious consequences equal to actual physical harm (Selner-O'Hagan et al. 1998). Youth aged 12-15 in the NLSCY sample are asked four questions concerning their own victimization. The following items are included:

During the past 12 months, how many times did someone:

- physically attack or assault you while at school or on a school bus?
- physically attack or assault you elsewhere including at home?
- threaten to hurt you without actually hurting you while at school or on a school bus?
- threaten to hurt you without actually hurting you elsewhere including at home?

Response categories ranged from 0 'never' to 3 'five times or more'. The victimization score resulting from the combined items ranged from 0 (never victimized) to 12 (victimized 5 times or more for each of the four items).[6] It should be noted that while the items included in the victimization variable do not specify sexual assault, youth may have included these incidents if they occurred within the context of a physical attack or assault. Therefore, the victimization measure used in this study can be viewed as a general measure of the youth's perception of multiple forms of victimization.

Socio-economic and demographic factors

Models in this study control for the child's sex, age in years, family structure, and level of family income adequacy. Although the link to family structure is by no means clear, some research indicates that the type of family that a child lives in affects his or her behavioural outcomes. For example, Lipman et al. (2002, 229) suggest that, on average, single parent families have greater levels of stress related to a variety of social and economic factors that may contribute to the development of problem behaviours in children.

Other studies have found that being in a stepparent family rather than residing with both biological parents is associated with an increased risk of juvenile delinquent behaviour, and that this is particularly the case for early onset delinquency initiated before the age of 15 (Coughlin and Vuchinich 1996). Finally, poverty during childhood has been linked to subsequent problem behaviour regardless of family structure (Sampson and Laub 1993).

Family structure is a three-category dummy-coded variable that contrasts families headed by two biological or two adoptive parents (reference category), with two other categories, single parent families and families in which a stepparent is present.

Income adequacy was derived from household income and household size (see Text Box 1). The three-category dummy-coded variable contrasts families with middle income (reference category) to families with lower levels of income adequacy and families at the upper-middle and highest income adequacy.

Text Box 1: Income adequacy

- Lowest: Household income is less than $10,000 and household size is 1-4 persons; or household income is less than $15,000 and household size is 5 or more persons.
- Lower-middle: Household income is $10,000-$14,999 and household size is 1-2 persons; or household income $10,000-$19,999 and household size is 3-4 persons; or household income is $15,000-$29,999 and household size is 5 or more persons.
- Middle: Household income is $15,000-$29,999 and household size is 1-2 persons; or household income is $20,000-$39,999 and household size is 3-4 more persons; or household income is $30,000-$59,999 and household size is 5 or more persons.
- Upper-middle: Household income is $30,000-$59,999 and household size is 1-2 persons; or household income $40,000-$79,999 and household size is 3-4 more persons, or household income is $60,000-$79,999 and household size is 5 or more persons.
- Highest: Household income is $60,000 or more and household size is 1-2 persons; or household income is $80,000 or more and household size is 3 or more persons.

Note: These categories are also used by the General Social Survey (GSS) and National Population Health Survey (NPHS).

Source: National Longitudinal Survey of Children and Youth User's Guide, 1994-95.

Findings

What are the differences between male and female self-reported offending in Canada?

The first aim of this study is to describe sex differences in delinquent behaviour. NLSCY data show that females aged 12 to 15 years report lower rates of delinquency than do males for each of the property-related and violent acts. These findings are consistent with police-reported data from Canada (Text Box 2), and with self-report data from other countries such as the United Kingdom and the United States (Huizinga et al. 1995; Kempf-Leonard et al. 2001; Espiritu et al. 2001; Baker 1998).

Table 1 shows male/female differences in estimates for both the nature and extent of delinquent acts. While roughly equal proportions of males reported committing violent (29.2%) and property-related (29.3%) delinquency, far fewer females reported similar behaviours. Fewer than 20% reported participating in property-related acts and about half as many (10%) reported involvement in violent acts.

In addition, when females did report delinquent behaviour, the nature of the act was different than for males. Overall, females more frequently committed the less serious forms of delinquency measured in the NLSCY. For instance, with respect to property, males report the more minor act of stealing from a store or school 1.4 times more often than females, but that ratio increases to about 2.5 to 3 times for more serious acts such as using, buying or selling stolen goods (fencing), stealing a vehicle, or arson.

This pattern is similar for violent delinquency. For all violent acts, the male to female ratio is roughly 3 to 1. Being in a fight that caused injuries was the most frequently reported violent act for both males (15%) and females (5%). Less common were acts such as carrying various weapons for defence, fighting with a weapon and threatening someone to get their money or property.

Table 1

Self-reported delinquent acts committed by males and females aged 12-15 years, 1998-99

	Males			Females			
	Estimated population		95% confidence	Estimated population		95% confidence	Male: Female
In the past 12 months, have you ever ...	'000	%	interval	'000	%	interval	ratio
Total property-related delinquency	**205.1**	**29.3**	**(26.3, 32.4)**	**130.5**	**19.1**	**(16.5, 21.7)**	**1.6**
Stolen something from store or school	131.8	20.9	(17.9, 23.9)	95.8	15.4 *	(12.8, 17.9)	1.4
Damaged other's property	107.7	17.3	(14.6, 19.9)	55.2	8.9 *	(7.1, 10.7)	2.0
Fenced stolen goods	62.7	10.0	(7.7, 12.3)	21.2	3.4 *E1	(2.3, 4.5)	3.0
Broken into a building to steal something	26.9	4.3 E1	(2.7, 5.8)	11.9	1.9 *E1	(1.1, 2.7)	2.3
Stolen a vehicle	28.5	4.2 E1	(2.7, 5.6)	11.5	1.7 *E1	(1.0, 2.4)	2.5
Set fire to something on purpose	25.2	3.7	(2.8, 4.6)	11.8	1.8 *E1	(0.9, 2.6)	2.1
Total violent delinquency	**202.9**	**29.2**	**(25.9, 32.5)**	**68.9**	**10.1 ***	**(8.2, 12.0)**	**2.9**
Fought causing physical injuries	92.1	14.8	(12.2, 17.5)	30.9	5.0 *E1	(3.4, 6.7)	3.0
Carried stick or club as a weapon	74.0	10.8	(8.4, 13.2)	15.2	2.3 *E2	(1.1, 3.4)	4.9
Carried a knife to defend or fight with	67.5	9.8	(7.8, 11.9)	23.7	3.5 *E1	(2.3, 4.8)	2.8
Fought with weapon	64.0	9.3	(7.2, 11.3)	23.8	3.5 *	(2.4, 4.6)	2.7
Threatened to get money or things	22.4	3.3 E1	(1.9, 4.6)	7.2	1.1 *E2	(0.5, 1.6)	3.1
Carried a gun to defend	20.9	3.0 E1	(1.8, 4.3)	F	F	...	...

Notes: Based on 2,155 male respondents aged 12-15 and 2,141 female respondents aged 12-15. Variables in this table are coded such that 1 = committed act at least once in past year, 0 = did not commit act in past year. The total offence categories indicate involvement in one or more of the offences listed in the category at least once in the past year.

E1 Coefficient of variation between 16.6% and 25.0%.

E2 Coefficient of variation between 25.1% and 33.3%.

F Coefficient of variation greater than 33.3%.

... Not applicable.

***** Significantly different from males ($p < 0.05$).

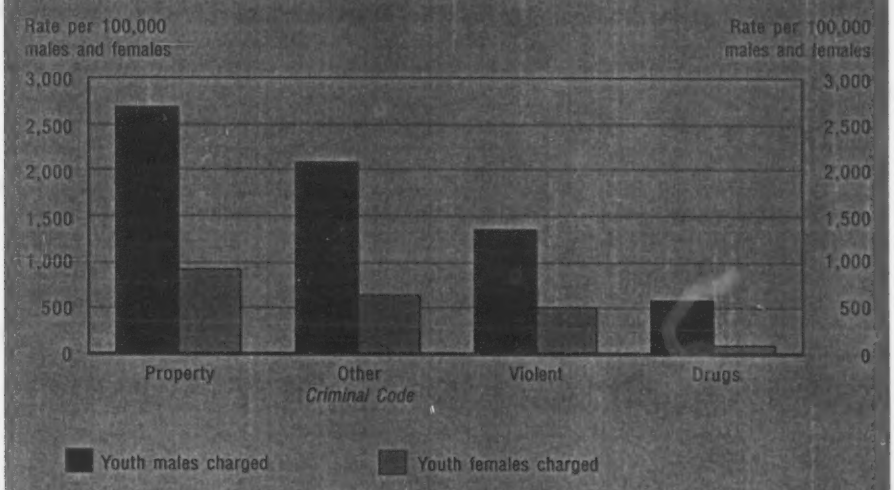
Data source: 1998/99 National Longitudinal Survey of Children and Youth, cross-sectional sample.

Text Box 2: Police reported rates of youth crime

As is the case with the self-reported data used in this study, police reports show that the majority of Canadian youths involved in crime are male. In 2001, the ratio of male to female youth charged for all offences was roughly 3 to 1. Figure 1 shows that males are charged at a greater rate than are females across all offence categories.

Figure 1

Rate of police charges per 100,000 males and females aged 12-17 years, 2001



Note: Other *Criminal Code* includes offences such as bail violations, mischief, offensive weapons and disturbing the peace.

Data source: Statistics Canada, Uniform Crime Reporting Survey, 2001.

Are males and females differently exposed to low school commitment and victimization?

The remaining tables and figures all bear on the second research question in this study, which is to test whether there are factors that explain differences in male and female delinquency patterns. To begin with, Table 2 shows male and female mean scores for the two factors of interest: school commitment and victimization. Keeping in mind that the lowest school commitment scores indicate the highest level of commitment, the table shows that the mean score for females (4.72) was significantly lower than for males (5.46). Thus, on average females were more committed to school than were males. With respect to the victimization scale, where a low score indicated the lowest levels of victimization, the mean score for females (0.57) was significantly lower than for males (1.18). On average, males in the sample reported higher levels of victimization than did females. In fact, about 48% of males reported being victimized at least once in the past year compared to about 28% of females.

It should be noted that the non-specific nature of the NLSCY victimization questions may lead to an undercounting of the prevalence of victimization, and in particular of sexual assaults, which may have greater consequences for female youth since other data sources indicate that females report experiencing higher levels of sexual assault than do males (Kong, Johnson, Beattie and Cardillo 2003). However, the higher level of victimization among males in the NLSCY sample is consistent with results from other household surveys of youth that focus specifically on injury sustained from assaults or robbery (Loeber, Kalb and Huizinga 2001).

Table 2

Mean scores for school commitment and victimization, 12-15 year olds

	Females			Males			
	Mean	95% CI	Sample size	Mean	95% CI	Sample size	Mean difference
School commitment	4.72	(4.53, 4.91)	1,764	5.46	(5.25, 5.67)	1,802	-0.74 *
Victimization	0.57	(0.50, 0.64)	1,760	1.18	(1.06, 1.29)	1,793	-0.61 *

Notes: The school commitment scale ranges from 0 to 21, where 0 = the highest level of commitment and 21 = the lowest level of commitment. The victimization scale ranges from 0 to 12, where 0 = no victimization and 12 = frequent victimization.

* Mean difference is significant ($p < 0.05$).

Data source: 1998/99 National Longitudinal Survey of Children and Youth, cross-sectional sample.

Text Box 3: What is an odds ratio?

When an outcome variable for a regression model is dichotomous, for example, committing a delinquent act versus not committing a delinquent act, researchers are interested in determining the probability of the occurrence of that event under a particular set of circumstances, for example, having low income, being female, or living in a single parent family. In this case logistic regression is the most appropriate technique to use.

An odds ratio is a statistic generated by a logistic regression and can be used to assess whether, other things being equal, youth with specific characteristics are more or less likely to engage in delinquent behaviour than those in another group, referred to as the reference category. For example, consider the risk of delinquency for youth with a low level of income adequacy compared to those with an average level (the reference category). An odds ratio near 1.0 implies there is no difference in delinquency between the two groups; an odds ratio less than 1.0 implies those in the group being considered (i.e. youth with a low level of income adequacy) are less likely to be delinquent than those in the reference group (i.e. youth with an average level of income adequacy) and an odds ratio greater than 1.0 implies those in the group being considered are more likely to be delinquent than those in the reference category.

When an explanatory variable is continuous (e.g. age measured in years), the odds ratio indicates how many times the ratio $P/(1-P)$ is greater or smaller for a one unit increase of this variable (e.g., for an individual who is one year older, than another individual). For example, an odds ratio of 2.0 indicates that the odds of delinquent behaviour are twice as high for a 12 year old as they are for an 11 year old.

Are males and females affected differently by their commitment to school?

Table 3 displays the partial odds ratios associated with the main effects for sex and school commitment, the interaction between sex and school commitment, and the set of socio-economic and demographic control variables, after controlling for the other variables in the model. The two models in the table estimate the likelihood of committing property-related and violent delinquency separately. Model 1 shows significant odds ratios for the main effects of sex and school commitment as well as for the interaction term (sex x school commitment) indicating that the effect of school commitment is significantly different for males and females.

The same result does not exist for violent offences (Model 2), where the main effects for sex and school commitment are significant, but the interaction term is not. This finding is supported by Sprott, Jenkins and Doob (2000) who found sex differences with respect to the protective effect of school attachment on property-related delinquency, particularly in the face of multiple risk factors, but did not find the same differences for violent offences. Similarly, Mears et al. (1998) found sex differences with respect to the protective effect of moral attitudes on property offences, specifically minor theft, but no such differences were reported for violent offences. The different results for property and violent delinquency in the NLSCY 12-15 year old sample, support the notion that there may be different catalysts for those involved in violent and property-related delinquency (Sprott, Jenkins and Doob 2000; Moffit 1993).

Table 3

The relationship between sex, school commitment and delinquency: Partial odds ratios for the risk of property and violent delinquency among youth 12-15 years of age

	Model 1 Property-related delinquency		Model 2 Violent delinquency	
	Odds ratio	95% CI	Odds ratio	95% CI
School commitment	1.23 *	(1.15, 1.31)	1.16 *	(1.08, 1.24)
Sex (male)	2.54 *	(1.53, 4.19)	4.27 *	(2.36, 7.73)
Sex (male) x School commitment	0.92 *	(0.86, 0.98)	0.97	(0.89, 1.06)
Stepparent	2.69 *	(1.86, 3.89)	2.41 *	(1.65, 3.52)
Single parent	1.40 *	(1.03, 1.91)	1.36 *	(0.97, 1.91)
Low income adequacy	1.05	(0.65, 1.69)	1.37	(0.89, 2.11)
High income adequacy	0.84	(0.63, 1.11)	0.94	(0.70, 1.27)
Age	1.19 *	(1.07, 1.33)	0.92	(0.81, 1.03)
Intercept	0.01 *	(0.00, 0.03)	0.14 *	(0.03, 0.73)

* Statistically significant ($p < 0.05$).

Data source: 1998/99 National Longitudinal Survey of Children and Youth, cross-sectional sample.

In order to assist in visualizing the interaction effect between sex and school commitment for property-related delinquency, Figure 2 shows a plot of the first model from Table 3. The lines correspond to the estimated log odds for males and females, and illustrate the sex differences in the propensity to commit property-related delinquency according to the level of commitment to school (controlling for the other independent variables in the model).

While the slopes indicate that school is important for both sexes, the steeper line for females suggests that a strong commitment to school acts as a greater barrier to property-related delinquency than it does for males. When school commitment is

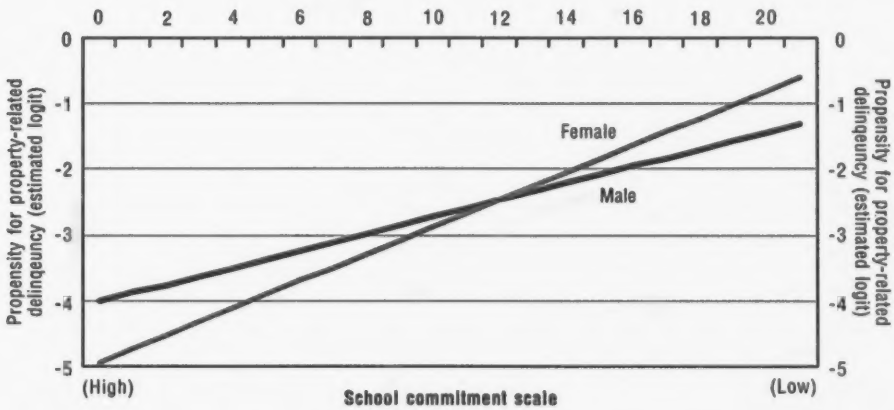
at its lowest, 21 on the scale, the likelihood for involvement in property-related delinquency is greater among females than males. In contrast, at the highest levels of commitment to school, 0 on the scale, the propensity for involvement in property offences is lower for females than for males.

Another way of interpreting the results in Figure 2 is by calculating the probability of delinquency *(exp(logit)/(1+exp(logit)))* at the highest and lowest levels of school commitment. This exercise shows that after controlling for other factors in the model, at the lowest level of school commitment (21 on the scale) a female would have a 36% chance of committing a property-related delinquent act, while a male would have a 21% chance. However, at the highest level of school commitment (0), males and females have similar and very low chances of committing these acts (1% and 2%, respectively).

Thus, the first model in Table 3 and the plot in Figure 2 show that school commitment influences the likelihood of involvement in property-related delinquent behaviour for both sexes. Other factors being equal, as the level of commitment to school increases, the likelihood of property-related delinquency decreases. The results also point to sex differences in this relationship, since females in particular have greater chances of engaging in property-related delinquency when they have the lowest commitment to school.

Figure 2

Relationship between sex and school commitment for property-related delinquency



Notes: Plot of Model 1 in Table 3. Controls for the other sociodemographic factors in the model.
Data source: 1998/99 NLSCY, cross-sectional sample.

Are males and females affected differently by experiences of victimization?

Evidence related to this question appears in Table 4, which displays the odds ratios associated with the main effects for sex and victimization, the interaction between sex and victimization, and the set of socio-economic and demographic control variables. The two separate models in the table estimate the likelihood of committing either property-related or violent delinquency. Both models display significant odds ratios for the interaction term (sex x victimization) indicating that males and females are affected differently by victimization.

Table 4

The relationship between sex, victimization and delinquency:
Partial odds ratios for the risk of property and violent delinquency among youth 12-15 years of age

	Model 1 Property-related delinquency		Model 2 Violent delinquency	
	Odds ratio	95% CI	Odds ratio	95% CI
Victimization	1.60 *	(1.38, 1.84)	1.65 *	(1.39, 1.95)
Sex (male)	1.77 *	(1.34, 2.34)	4.51 *	(3.23, 6.30)
Sex (male) x Victimization	0.82 *	(0.70, 0.96)	0.75 *	(0.62, 0.90)
Stepparent	2.48 *	(1.71, 3.58)	2.17 *	(1.47, 3.18)
Single parent	1.44 *	(1.05, 1.98)	1.33	(0.94, 1.88)
Low income adequacy	1.08	(0.68, 1.71)	1.42	(0.88, 2.27)
High income adequacy	0.88	(0.67, 1.15)	0.94	(0.70, 1.26)
Age	1.30 *	(1.17, 1.44)	0.99	(0.89, 1.11)
Intercept	0.00 *	(0.00, 0.02)	0.07 *	(0.01, 0.34)

* Statistically significant ($p < 0.05$).

Data source: 1998/99 National Longitudinal Survey of Children and Youth, cross-sectional sample.

Figures 3 and 4 provide visual representations of the models from Table 4. Once again, the plotted lines correspond to the estimated log odds for males and females, and illustrate the sex differences in the propensity to commit both violent and property-related delinquency according to the level of self-reported victimization (controlling for the other independent variables in the model).

For both types of delinquency, females are most affected at the highest levels of self-reported victimization, showing higher odds of delinquency than males at the high end of the victimization scale (12). When victimization is at its lowest level, 0 or none, the female odds for delinquency drop below those for males.

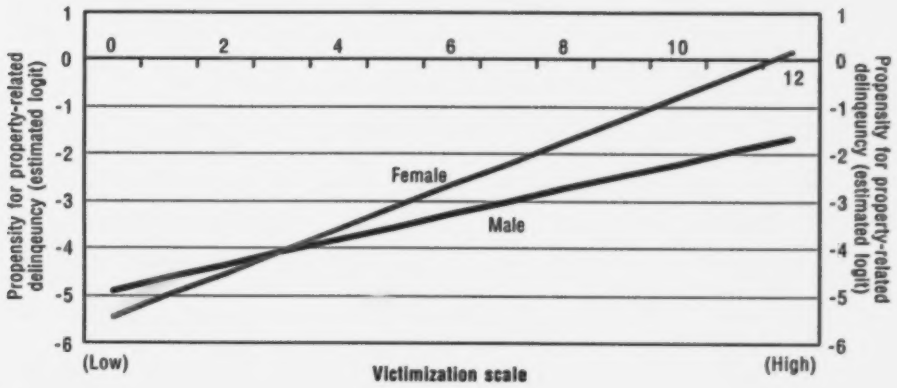
An examination of the probability of property-related delinquent behaviour, *(exp(logit)/(1+exp(logit)))*, reveals that at the highest level of victimization (12) a female would have a 53% chance of committing a property-related delinquent act, while a male would have about a 16% chance, and at the lowest level of victimization (0), males and females have roughly similar chances at 1% and less than 1%, respectively.

Now considering the probabilities for violent delinquency, when an individual has experienced the greatest level of victimization, the probability of also committing a violent act is higher for both sexes. However, this is particularly the case for females who experience an over 90% chance of committing a violent act compared to males with a 79% chance.

The plots in Figures 3 and 4 make it possible to visualize the relationship between victimization and delinquency for 12-15 year olds in the NLSCY sample. After controlling for the other variables in the models, one can see that as the level of victimization increases, levels of property-related and violent delinquency also increase. While the direction of this relationship is consistent for males and females, the data indicate that there are some differences between the sexes. At the highest levels of victimization, females exhibit greater chances of engaging in both forms of delinquency, than is the case for males.

Figure 3

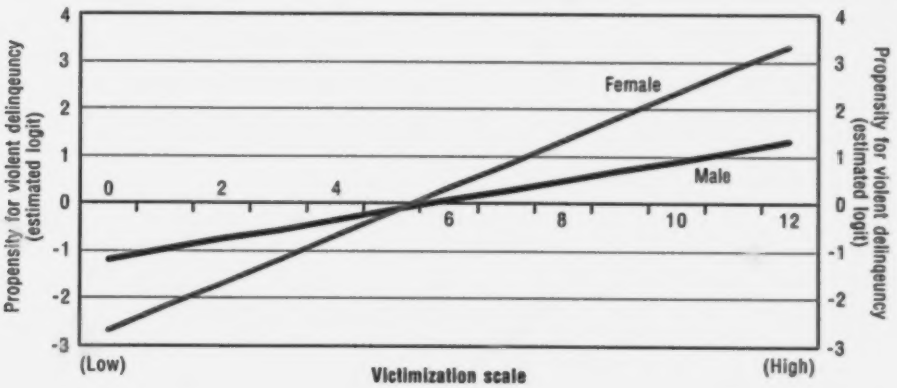
Relationship between sex and self-reported victimization for property-related delinquency



Notes: Plot of Model 1 in Table 4. Controls for the other sociodemographic factors in the model.
Data source: 1998/99 NLSCY, cross-sectional sample.

Figure 4

Relationship between sex and self-reported victimization for violent delinquency



Notes: Plot of Model 2 in Table 4. Controls for the other sociodemographic factors in the model.
Data source: 1998/99 NLSCY, cross-sectional sample.

Discussion

The issue of sex differences in delinquent behaviour is significant with respect to the development of policies and programs intended to affect these behaviours. The results of this study suggest that male and female youths may benefit differently from targeted crime prevention programs. Understanding the differences in causes of crime and delinquency is essential for developing appropriate strategies for intervention and prevention.

This study points to a number of tentative results. First, the NLSCY data corroborate the gender gap in self- and police-reported delinquency found in other research (Huizinga et al. 1995; Kempf-Leonard et al. 2001; Espiritu et al. 2001; Baker 1998). Female youths report lower rates of delinquency than do males for all property-related and violent acts. Second, on average, males report lower levels of commitment to school and higher levels of victimization.

Despite the greater exposure among males to both low school commitment and victimization, the NLSCY data suggest that females may have an increased sensitivity to both factors. While the data illustrate that male and female levels of delinquency were associated with these factors, the lowest levels of school commitment and highest levels of victimization increased the statistical chances of engaging in delinquency more for females than for males. Specifically, females reported more property-related delinquency when they had the lowest commitment to school, and more property-related and violent delinquency at the highest levels of self-reported victimization.

While it must be underscored that the presence of a risk factor is not necessarily predictive of future delinquency, and that the links among these factors explored in this paper are only correlational; the results suggest that that there is a relationship between delinquent behaviour and both low school commitment and previous experiences of victimization for males and females. The greater strength of this relationship for females than males supports previous research pointing to sex differences in the way males and females orient themselves toward others, and in the impact of failed, absent or abusive relationships at school or at home (Taylor, Gilligan and Sullivan 1995). Moreover, the results support the notion that intervention strategies that are specific to females "must consider relationships as key areas in their lives" (Artz 2001, 37).

Future research and limitations

Pathways to delinquency are complex and affected in many different ways that may change throughout the life course. Future work examining the differential effects of risk and protective factors on males and females will need to take into account such potentially mediating factors as delinquent peers, levels of opportunity and control, gender roles, and attachment to conventional values. In addition, risk and protective

factors may vary for males and females in different ways as they grow into adulthood. This can be tested with the release of future NLSCY cycles containing information on delinquency.

Finally, this study has an important limitation, since it relies primarily on data from the third, and most recently available cycle of the NLSCY. Statistics Canada allocated the initial cycle 1 sample of the survey to provide sufficient numbers in each age group to reliably measure characteristics with a national prevalence of 4% for each age group after five survey cycles. However, a natural rate of attrition is expected with any longitudinal survey. A small proportion of families refuse to continue participation in the survey at each cycle, and these families may be disproportionately those at higher risk of turmoil, conflict and delinquent behaviour by their children. Thus, self-report rates presented in this study may underestimate the prevalence of delinquent behaviour; nonetheless, these data improve our understanding of offending behaviour by adding to existing information captured by police agencies.

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Endnotes

1 More information about the NLSCY is available in Survey Overview
http://www.statcan.ca/english/freepub/89F0078XIE/99003.pdf

2 Logistic regression techniques are used in this analysis instead of ordinary least squares regression because the outcome variables of interest contain only two categories: committing at least one delinquent act in the past year versus committing no delinquent acts in the past year.

3 The reliability coefficient (Cronbach's Alpha) for the property-related delinquency scale is $\alpha = .75$. Cronbach alpha is a measure of internal consistency, based on the average correlation between items. It is assumed that items are positively correlated with each other because they are attempting to measure a common construct; therefore, a Cronbach's alpha close to 1 indicates perfect consistency between items.

4 The reliability coefficient (Cronbach Alpha) for the violent delinquency scale is $\alpha = .70$.

5 The reliability coefficient (Cronbach Alpha) for the school commitment scale is $\alpha = .73$.

6 The reliability coefficient (Cronbach's Alpha) for the victimization scale is $\alpha = .67$.

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